

CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-78 (Cancelled)

79. (Original) An automatic focusing method for an optical system comprising the step of establishing a global focal plane comprising the steps of:

- (a) determining an index axis coordinate, a scan axis coordinate, and a focus axis coordinate corresponding to each of three non-collinear locations on a slide; and
- (b) determining a numerical representation of the global focal plane using the index axis coordinates, the scan axis coordinates, and the focus axis coordinates.

80. (Original) The method according to claim 79, wherein the step of establishing the global focal plane further comprises the steps of:

- (c) calculating an index axis slope and a scan axis slope;
- (d) determining whether at least one of the index axis slope and the scan axis slope is below a respective corresponding predetermined value; and
- (e) flagging the slide, if at least one of the index axis slope and the scan axis slope is not below the respective corresponding predetermined value.

81. (Original) An automatic focusing method for an optical system comprising the step of performing a scan pass comprising the steps of:

- (a) determining a first coordinate that provides a focus value within a predetermined range of an optimal focus value for a first position on a slide substantially corresponding to a first point on a surface substantially corresponding to the surface of the slide;
- (b) moving an element of the optical system relative to the surface of the slide to a position substantially corresponding to the first coordinate; and
- (c) recording the first coordinate corresponding to the first point.

82. (Original) The method according to claim 81, wherein the step of performing the scan pass further comprises the steps of:

- (d) determining an area of fine focus jurisdiction surrounding the first point; and
- (e) correlating the first coordinate with the area of fine focus jurisdiction.

83. (Original) The method according to claim 82, wherein the area of fine focus jurisdiction is generally elliptical in shape.

84. (Original) The method according to claim 83, wherein the area of fine focus jurisdiction has a major axis substantially parallel to a scan axis of the optical system and has a minor axis substantially parallel to an index axis of the optical system.

85. (Original) The method according to claim 82, wherein the step of performing the scan pass further comprises the step of:

- (f) determining a second coordinate that provides a focus value within a predetermined range of an optimal focus value for a second position on the slide substantially corresponding to a second point on a surface substantially corresponding to the surface of the slide, comprising the steps of:
 - (I) determining whether the second point lies within at least one previously-determined area of fine focus jurisdiction; and

(II) determining an area of fine focus jurisdiction surrounding the second point, if the determination in (I) is negative.

86. (Original) The method according to claim 85, wherein step (f) further comprises the steps of:

(III) determining a global focal surface; and

(IV) determining a first estimate of the second coordinate using a representation of the global focal surface.

87. (Original) The method according to claim 85, wherein step (f) further comprises the steps of:

(III) determining whether the second point lies within exactly one area of fine focus jurisdiction; and

(IV) retrieving the coordinate correlated with the one area of fine focus jurisdiction, if the determination in (III) is positive.

88. (Original) The method according to claim 87, wherein step (f) further comprises the steps of:

(V) determining a global focal surface;

(VI) adjusting the coordinate of step (IV) according to the global focal surface; and

(VII) moving an element of the optical system relative to the surface of the slide to a position substantially corresponding to the adjusted coordinate of step (VI).

89. (Original) The method according to claim 85, wherein step (f) further comprises the steps of:

(III) determining whether the second point lies within more than one area of fine focus jurisdiction; and

(IV) retrieving respective coordinates correlated with each of the more than one areas of fine focus jurisdiction, if the determination in (III) is positive.

90. (Original) The method according to claim 89, wherein step (f) further comprises the step of:

(V) using a weighted average of each of the retrieved coordinates based on respective distances of the second point from at least one respective point within each of the more than one areas of fine focus jurisdiction to determine a resultant coordinate.

91. (Original) The method according to claim 89, wherein step (f) further comprises the steps of:

(V) determining a global focal surface;

(VI) determining a composite coordinate based on at least one of the retrieved coordinates of step (IV);

(VII) adjusting the composite coordinate according to the global focal surface; and

(VIII) moving an element of the optical system relative to the surface of the slide to a position substantially corresponding to the adjusted coordinate of step (VII).

92. (Original) The method according to claim 82, wherein the step of performing a scan pass further comprises the step of:

(e) correlating the area of fine focus with a bin that represents a region substantially corresponding to a region on the surface of the slide.

93. (Original) The method according to claim 85, wherein the determination in step (I) of whether the second point lies within at least one previously-determined area of fine focus jurisdiction is made by searching only those areas of fine focus jurisdiction which at least partially intersect a bin containing the second point.

94. (Original) The method according to claim 82, wherein the step of performing a scan pass further comprises the step of:

(f) determining whether a second position on the slide lies within an area of interest of the slide.

95. (Original) An automatic focusing method for an optical system comprising the steps of:

- (a) establishing a global focal surface;
- (b) determining whether a point substantially corresponding to a position located on an area of interest of a slide lies within at least one previously determined area of fine focus jurisdiction;
- (c) determining a coordinate that provides a locus value within a predetermined range of an optimal focus value for the position on the slide;
- (d) imaging a region surrounding the position; and
- (e) repeating at least steps (b) through (d) until substantially all of the area of interest is imaged.

96. (Original) The method according to claim 81, wherein step (b) further comprises moving an element of an optical system relative to the surface of the slide to a position substantially corresponding to the coordinate, and modifying a checksum variable in an amount corresponding to the movement of the element of the optical system.

97. (Original) An automatic focusing method for an optical system comprising the step of determining an efficient order of presentation of fields of interest on a slide using an algorithm.

98. (Original) The method according to claim 95, wherein the surface of the slide is substantially planar and the slide is of substantially uniform thickness.

99. (Original) An automatic focusing method for an optical system comprising the steps of:

- (a) performing an initial coarse focus at a first position substantially corresponding to a first point on a surface substantially corresponding to the surface of a slide; and
- (b) subsequently performing a plurality of subsequent fine focuses at different positions, wherein each of the fine focuses are performed more quickly than the initial coarse focus.

100. (Original) The method according to claim 99, wherein step (a) comprises the steps of:

- (I) imaging the slide at the first position;
- (II) determining a focus score at the first position;
- (III) subsequently moving an element of the optical system relative to the surface of the slide by a first amount to a second position;
- (IV) subsequently imaging the slide at the second position;
- (V) determining a focus score at the second position;
- (VI) moving an element of the optical system relative to the surface of the slide by a second amount that is less than the first amount.

101. (Original) The method according to claim 99, wherein the fine focuses of step (b) are each performed by imaging a position substantially corresponding to a point on the surface of the slide no more than five times.